

**EPA SLN No. MI080001**

## NOTE TO FILE

date: 3/12/2010  
from: Tom Harris, RD/IRB  
re: history of Treeage SLNs

Treeage is a 4.0% liquid formulation of emamectin benzoate. The product is used straight or mixed with water, poured into commercial tree injection equipment, and injected into trees.

The Sec 3 application for 100-RGNO was received from Syngenta on 12/21/2007 for a general use product to be used on a variety of ornamental trees to control a variety of pests. The product was registered on 7/11/2009 as an RUP for use on ash trees only to control emerald ash borer. A subsequent amendment was approved 11/13/2009 adding a 2-year efficacy claim. A minor amendment was approved 3/24/2010 to remove stray text referring to non-ash sites.

On 3/27/2008 EPA received the first SLN application (WV080002). This was followed over the next year by similar SLNs in IL, IN, KY, MD, MI, MN, MO, OH, PA, VA, and WI. Even though the Sec 3 was not yet registered there was much interest in the product to control Emerald Ash Borer (EAB), an imported pest which had gained quarantine pest status. There were few alternatives (imidacloprid and dinotefuran will also control EAB; see those files for exactly when <sup>Sec</sup> they chemical was registered for this use) and emamectin provided excellent and long lasting control.

To handle this unusual situation (an SLN on a unregistered Sec 3 product) we came up with the following approach. The product container was labeled with a minimal label with basic identification, handling, disposal statements, and a reference to see any applicable state label. There were no application instructions on the product container; instead, the SLN detailed the application instructions. Both container and SLN labels were general use.

When the Sec 3 was finally registered it was as a restricted use pesticide (RUP) due to acute tox to worker (eye II). Application was restricted to ash trees for EAB. Essentially, the accepted Sec 3 label duplicated the SLNs and eliminated the need for separate SLNs. However, Syngenta did not want to go into full scale production until a 2-year efficacy claim was added to the label. They had attempted to include this claim from the beginning but satisfactory efficacy data was not submitted until Fall 2009 with the resulting label approved on 11/13/2009. At this point, Syngenta had what they considered a marketable product but a contract agreement called for the end-use product to be actually marketed by a distributor, Arborjet. Due to contract negotiations and Arborjet's production schedule, final product was not anticipated to be available until summer 2010.

**Treeage - emamectin, tree injection for Emerald Ash Borer**  
**Sec 3 (100-1309) registered 7/11/2009**

**Summary Report**

expiration date

Registration #	Name	Status	Restricted Use Product	Company #	Company Name	Percent Active Ingredient	Active Ingredient
IL080001	TREEAGE-AGE	Under Review (16-Apr-2008)	N	100	SYNGENTA CROP PROTECTION, INC.	4 expires 4/15/2013	emamectin benzoate
IN080001	TREE-AGE	Under Review (25-Mar-2008)	N	100	SYNGENTA CROP PROTECTION, INC.	4 no expiration given	emamectin benzoate
KY090029	TREE-AGE	Under Review (09-Jun-2009)	N	100	SYNGENTA CROP PROTECTION, INC.	4 expired 12/31/09	emamectin benzoate
MD090001	TREE-AGE	Under Review (26-Feb-2009)	N	100	SYNGENTA CROP PROTECTION, INC.	4 expired 12/31/09	emamectin benzoate
MI080001	TREE-AGE	Under Review (28-Mar-2008)	N	100	SYNGENTA CROP PROTECTION, INC.	4 expires 12/31/14	emamectin benzoate
MN080009	TREE-AGE	Under Review (03-Jul-2008)	N	100	SYNGENTA CROP PROTECTION, INC.	4 no expiration given	emamectin benzoate
MO080006	TREE-AGE	Under Review (21-Nov-2008)	N	100	SYNGENTA CROP PROTECTION, INC.	4 no expiration given	emamectin benzoate
OH080002	TREE-AGE	Under Review (25-Mar-2008)	N	100	SYNGENTA CROP PROTECTION, INC.	4 no expiration given	emamectin benzoate
PA090001	TREE-AGE	Under Review (02-Jan-2009)	N	100	SYNGENTA CROP PROTECTION, INC.	4 expires 12/31/2014	emamectin benzoate
VA080008	TREEAGE-AGE	Under Review (18-Nov-2008)	N	100	SYNGENTA CROP PROTECTION, INC.	4 expires 12/31/10 ?	emamectin benzoate

OPPIN Query 3/9/2010, expirations edited 3/11/10



State Regulatory Affairs  
410 Swing Road  
Greensboro, NC 27419

Telephone: (336) 632 2146  
Fax: (336) 632 2884

March 12, 2010

Brian Rowe  
Pesticide Section Manager  
Michigan Department of Agriculture  
Pesticide and Plant Pest Management Division  
P.O. Box 30017  
Lansing, MI 48909

SUBJECT:	TREE-äge™ (EPA Reg. No. 100-1309) EPA SLN No. MI-080001 Cancellation of Section 24(c) Active Ingredient: Enamectin Benzoate
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Dear Mr. Rowe:

Syngenta Crop Protection is requesting immediate cancellation of the subject Section 24(c).

If you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Larry Zang".

Larry Zang  
Senior Regulatory Manager



JENNIFER M. GRANHOLM  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF AGRICULTURE  
LANSING

DON KOIVISTO  
DIRECTOR

March 15, 2010

Meredith Laws, Insecticide-Rodenticide Branch Chief  
U.S. EPA / Office of Pesticide Programs (7504P)  
Document Processing Desk (EMEX)  
Room S4900, One Potomac Yard  
2777 S. Crystal Drive  
Arlington, VA 22202

Dear Ms. Laws:

In 2008, the Michigan Department of Agriculture issued a Special Local Needs registration for the use of emamectin benzoate (Tree-Age) on ash trees to control emerald ash borer (MI-080001). Syngenta Crop Protection, the registrant of Tree-Age, has notified the Michigan Department of Agriculture and requested that the SLN be canceled. Therefore, please accept this letter as a formal request to cancel SLN number MI-080001, effective immediately.

If you need additional information, please contact me by phone at (517) 241-3267 or by email at [verhougstraeteb@michigan.gov](mailto:verhougstraeteb@michigan.gov).

Sincerely,

Brian Verhougstraete  
Pesticide Registration Manager  
Pesticide & Plant Pest Mngt. Division

Enclosure



State Regulatory Affairs  
410 Swing Road  
Greensboro, NC 27419

Telephone: (336) 632 2146  
Fax: (336) 632 2884

March 12, 2010

Brian Rowe  
Pesticide Section Manager  
Michigan Department of Agriculture  
Pesticide and Plant Pest Management Division  
P.O. Box 30017  
Lansing, MI 48909

SUBJECT: TREE-äge™ (EPA Reg. No. 100-1309)  
EPA SLN No. MI-080001  
Cancellation of Section 24(c)  
Active Ingredient: Enamectin Benzoate

Dear Mr. Rowe:

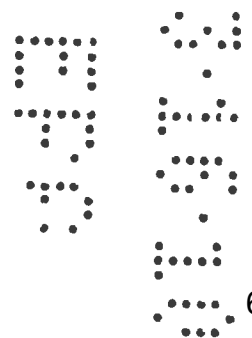
Syngenta Crop Protection is requesting immediate cancellation of the subject Section 24(c).

If you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Larry Zang".

Larry Zang  
Senior Regulatory Manager







Re: Fw: SLNs for Emerald Ash Borers  
Brian Verhougstraete to: Meredith Laws  
Cc: Thomas Harris, "Brian Rowe"

03/11/2010 11:02 AM

Hi Meredith,  
Just as an FYI, Michigan's Tree-Age label has an expiration date of 3/31/2014.  
Regards,  
Brian

Brian Verhougstraete  
Pesticide Registration Manager  
Pesticide & Plant Pest Mngt. Division  
Michigan Department of Agriculture  
Ph. 517-241-3267  
Fax: 517-335-4540

>>> <harris.thomas@epamail.epa.gov> 3/11/2010 10:32 AM >>>

Tom Harris  
EPA/OPPTS/OPP/RD/IRB  
voice: (703) 308-9423  
fax: (703) 308-0029  
harris.thomas@epa.gov  
visit <http://www.epa.gov/pesticides>  
----- Forwarded by Thomas Harris/DC/USEPA/US on 03/11/2010 10:31 AM  
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From: Meredith Laws/DC/USEPA/US  
  
To: scott.frank@illinois.gov, scottde@purdue.edu,  
misty.pursiful@ky.gov, davidspb@mda.state.md.us,  
roweb@michigan.gov, paul.liemandt@state.mn.us,  
paul.bailey@mda.mo.gov, beal@agri.ohio.gov,  
jlake@state.pa.us, micah.raub@vdacs.virginia.gov,  
patricia.kandziora@wisconsin.gov,  
gbishop@ag.state.wv.us  
  
Cc: JGray@nd.gov, Jim Roelofs/DC/USEPA/US@EPA, Thomas  
Harris/DC/USEPA/US, Venus Eagle/DC/USEPA/US, Jim  
Tompkins/DC/USEPA/US@EPA  
  
Date: 03/10/2010 01:49 PM  
  
Subject: SLNs for Emerald Ash Borers

Dear State Lead Agencies:

Attached is a table listing 12 SLNs that have been issued for the emamectin benzoate product "Tree-Age" to combat Emerald Ash Borer. There are some issues going on with this situation that are of concern to the Registration Division.

The section 3 product was registered on July 11, 2009; EPA Reg. No. 100-1309.

The SLNs were based on an unregistered formulation. Our review of the section 3 requires the product to be Restricted Use. The SLNs

NEW APPLICATIONS

DATE: 03-28-2008

FILE NUMBER: M1080001

FEP (OPP IN ENTRY) Bj 03-28-2008  
(Initial & date)

FILE ROOM: \_\_\_\_\_  
(Initial & date)

SIG: SA 4/1/08  
(Initial & date)

FILE ROOM: JW 4-2-08  
(Initial & date)

✓ ASSIGN TO PM 07 (NO DATA)

       JACKET TO SHELF (DATA)





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

March 28, 2008

OFFICE OF  
PREVENTION, PESTICIDES AND  
TOXIC SUBSTANCES

Michigan Department of Agriculture  
525 W. Allegan  
P.O. Box 30017  
Lansing, MI 48909

ATTN: Brian Verhougstraete, Manager

Dear State Agency:

The Office of Pesticide Programs acknowledges receipt of the Section 24(c) application/notification for MI080001.

The package is being forwarded to the Product Manager for review.

To ensure that the Agency receives proper notification of your 24(c) applications/notifications it is necessary to use the correct mailing address. All new 24(c) applications should be sent to the following:

Document Processing Desk (SLN)  
Office of Pesticide Programs -7504P  
U.S. Environmental Protection Agency  
Ariel Rios Building  
1200 Pennsylvania Avenue, N.W.  
Washington, DC 20460

If you have any questions concerning the administrative screening of the package please contact the Front End Unit at (703)305-5780.

Sincerely,

A handwritten signature in blue ink, appearing to read "Barbara Puma".

Front End Processing Staff  
Information Services Branch  
Information Technology & Resources Management Division

## 24(C) CHECKLIST

STATE: MICHIGANSLN NO. M1080001DATE REGISTERED: 03/27/0890-DAY DATE: 06/27/2008

SPECIFIC SPECIAL LOCAL NEED: \_\_\_\_\_

SITE: \_\_\_\_\_

PEST/PROBLEM: \_\_\_\_\_

1. Is the State certified to issue this type of registration? \_\_\_\_\_
2. Was the EPA Application/Notification Form submitted? \_\_\_\_\_
3. Was all the required information included on the form? \_\_\_\_\_
4. Was a confidential formula submitted (for new products)? \_\_\_\_\_
5. Is this registration for a "CHANGED USE PATTERN"? \_\_\_\_\_
6. Has an FR document been prepared for this "CHANGED USE PATTERN"? \_\_\_\_\_
7. Tolerances required? \_\_\_\_\_ Established? \_\_\_\_\_ Citation: \_\_\_\_\_
8. Full labeling being used? \_\_\_\_\_ Supplemental directions? \_\_\_\_\_
9. Does label state "FOR DISTRIBUTION AND USE ONLY WITHIN (State)"? \_\_\_\_\_
10. Does full label comply with 40 CFR 162.10, as follows:
- a. Product name, brand or trademark? \_\_\_\_\_
  - b. Name and address of registrant? \_\_\_\_\_
  - c. Net contents? \_\_\_\_\_
  - d. Product registration number? \_\_\_\_\_
  - e. Producing establishment number? \_\_\_\_\_
  - f. Ingredient statement? \_\_\_\_\_
  - g. Precautionary labeling? \_\_\_\_\_
  - h. Directions for use for special local need? \_\_\_\_\_
  - i. Use classification? \_\_\_\_\_

Was proper format followed? \_\_\_\_\_

11. Is supplemental directions for use labeling satisfactory? \_\_\_\_\_
12. Was supplemental labeling compared with EPA-registered label? \_\_\_\_\_

COMMENTS: \_\_\_\_\_

1. SLN No. M1080001 2. PM 07 3. Action Code \_\_\_\_\_

4. State Issue Date

032708

5. Date received by EPA

032808

6. Date received by PM

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Chemical name \_\_\_\_\_

8. Chemical code 4

9. Use \_\_\_\_\_

10. Reviews requested:

	Date Sent	Due Date	Date Returned	Response Code	Response Date
HED					
EPB					
RCB					
EEB					
TB					
RD					
PK					
S					
Precaution Labeling					
Chemistry					
Efficacy					

11. Status \_\_\_\_\_

12. FINAL ACTION Response code \_\_\_\_\_

Response Date

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



JENNIFER M. GRANHOLM  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF AGRICULTURE  
LANSING

DON KOIVISTO  
DIRECTOR

March 27, 2008

Dr. Lois Rossi, Director  
Registration Division (7505P)  
Office of Pesticide Programs  
U.S. Environmental Protection Agency  
2777 Crystal Drive  
Arlington, VA 22202

Dear Dr. Rossi:

SUBJECT: SLN Registration for emamectin benzoate (Tree-Äge)

This is to inform you that the Michigan Department of Agriculture has issued a registration for the use of Tree-Äge (emamectin benzoate) on ash trees for the control emerald ash borer (EAB) to meet special local needs (SLN) under section 24(c) of the Federal Insecticide Fungicide and Rodenticide Act as Amended. The registration is effective April 1, 2008 and pending EPA review, will be valid for a period of one year or until March 31, 2009. The EPA SLN registration number is MI-080001. It is anticipated that Tree-Äge will receive a section 3 registration within the calendar year.

**Description of the Special Local Need:**

Emerald Ash borer (EAB) is an exotic pest which was identified in southeastern Michigan in 2002. The pest is native to Asia and feeds on all varieties of ash trees (*fraxinus* sp.). To date, this pest has only been found in Indiana, Illinois, Maryland, Michigan, Ohio, Pennsylvania, and West Virginia. EAB destroys ash trees in its larval stage where it feeds in the cambium between the bark and wood, producing galleries that eventually girdle and kill branches and entire trees. It is estimated that EAB has already destroyed more than 25 million of Michigan's estimated 800 million ash. Without an effective control, it is likely that the remaining ash will succumb to this exotic beetle. Therefore, it is essential that effective treatments be used to protect Michigan's remaining ash resource and to slow the spread of the pest to other states.

**Alternative Controls:**

In 2007, Dr. Deborah McCullough of Michigan State University, one of the nations leading EAB researchers, conducted a study which assessed the effectiveness of emamectin benzoate on EAB (see attached report). A key part of the study compared the efficacy of emamectin benzoate to currently registered EAB products which include: Imicide (10% imidacloprid), Macho 2F (21.4% imidacloprid), and Safari (20% dinotefuron).

According to Dr. McCullough's research, emamectin benzoate had greater than a 99% mortality rate on EAB larvae and adults. This is significantly higher than any other product that was

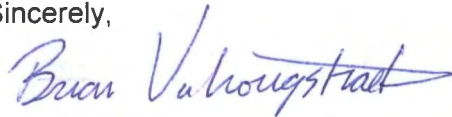
evaluated. In Dr. McCullough's opinion, this product is not only critical to controlling EAB in Michigan, but it has the potential to slow the spread of the pest across the nation. Included with this notification is a letter of support from Dr. McCullough which includes the details of her recent study.

**Endangered Species:**

The use of Tree-Äge would occur statewide. Endangered species are not expected to be impacted by this product because it is applied through injection; thus, severely limiting the potential for run-off or drift.

Additional information will be provided on request.


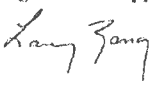
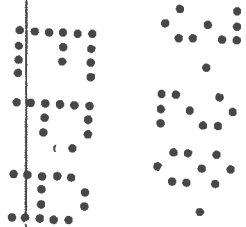
Sincerely,



Brian Verhougstraete,  
Pesticide Registration Program Manager  
Pesticide & Plant Pest Management Division

cc: Bruce Wilkinson, Region V EPA  
Larry Zang, Syngenta Crop Protection

Enclosures

	<b>United States Environmental Protection Agency</b> <b>Office of Pesticide Programs, Registration Division (7505C)</b> <b>Washington, DC 20460</b> <b>Application for/Notification of State Registration</b> <b>of a Pesticide To Meet a Special Local Need</b> <i>(Pursuant to section 24(c) of the Federal Insecticide,</i> <i>Fungicide, and Rodenticide Act as Amended)</i>		<b>For State Use Only</b> Registration No. Assigned <b>MI-080001</b> Date Registration Issued <b>March 27, 2008</b>				
	<b>1. Name and Address of Applicant for Registration</b> Syngenta Crop Protection, Inc. PO Box 18300 Greensboro, NC 27419	<b>2. Product is (Check one)</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"> <b>EPA-Registered</b>  <input type="checkbox"/> </td> <td style="width: 40%;"> <b>EPA Registration Number</b>          100-RGNO       </td> </tr> <tr> <td> <b>New (not EPA-registered)</b>  <input checked="" type="checkbox"/> Attach EPA Form 8570-4, Confidential Statement of Formula for new products.       </td> <td> <b>EPA Company Number</b>          100       </td> </tr> </table>		<b>EPA-Registered</b> <input type="checkbox"/>	<b>EPA Registration Number</b> 100-RGNO	<b>New (not EPA-registered)</b> <input checked="" type="checkbox"/> Attach EPA Form 8570-4, Confidential Statement of Formula for new products.	<b>EPA Company Number</b> 100
	<b>EPA-Registered</b> <input type="checkbox"/>	<b>EPA Registration Number</b> 100-RGNO					
<b>New (not EPA-registered)</b> <input checked="" type="checkbox"/> Attach EPA Form 8570-4, Confidential Statement of Formula for new products.	<b>EPA Company Number</b> 100						
<b>3. Active Ingredient(s) in Product</b> Emamectin benzoate							
<b>4. Product Name</b> TREE-age™	<b>5. If this is a food/feed use, a tolerance or other residue clearance is required. Cite appropriate regulations in 40 CFR Part 180. 186, and/or 186. non-food use</b>						
<b>6. Type of Registration (Give details in Item 13 or on a separate page, properly identified and attached to this form):</b> <input checked="" type="checkbox"/> a. To permit use of a new product. <input type="checkbox"/> b. To amend EPA registration for one or more of the following purposes: <input type="checkbox"/> (1) To permit use on additional crops or animals. <input type="checkbox"/> (2) To permit use at additional rates. <input type="checkbox"/> (3) To permit use against additional pests. <input type="checkbox"/> (4) To permit use of additional application techniques or equipment. <input type="checkbox"/> (5) To permit use at different application sites. <input type="checkbox"/> (6) Other (specify below) See paragraph 13	<b>7. Nature of Special Local Need (check one)</b> X - See paragraph 13 <input type="checkbox"/> There is no pesticide product registered by EPA for such use. <input checked="" type="checkbox"/> There is no EPA-registered pesticide product which, under the conditions of use within the State, would be as safe and/or as efficacious for such use within the terms and conditions of EPA registration. <input type="checkbox"/> As appropriate EPA-registered pesticide product is not available.						
<b>10. Has FIFRA section 24(c) registration for this use of the product ever, by another State, been (check appropriate box(es), if known):</b> <input type="checkbox"/> Sought <input type="checkbox"/> Issued <input type="checkbox"/> Denied <input type="checkbox"/> Revoked If any of the above are checked, list States in Item 13 below. <input checked="" type="checkbox"/> No FIFRA section 24(c) Action	<b>8. If this registration is an amendment to an EPA-registered product, is it for a "new use" as defined in 40 CFR 152.3?</b> <input type="checkbox"/> Yes (discuss in Item 13 below) <input type="checkbox"/> No <b>9. Has an EPA Registration or Experimental Use Permit for this chemical even been (check applicable box(es), if known):</b> <input type="checkbox"/> Sought <input type="checkbox"/> Issued <input type="checkbox"/> Denied <input type="checkbox"/> Cancelled <input type="checkbox"/> Suspended <input type="checkbox"/> Registration <input type="checkbox"/> Experimental Use Permit <input checked="" type="checkbox"/> No Previous Permit Action						
<b>Certification</b> I certify that the statements I have made on this form and all attachments thereto are true, accurate, and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law. <b>Signature of Applicant or Authorized Representative</b> 	<b>11. Endangered Species Act: (Give details in Item 13 or on a separate page, properly identified and attached to this form.)</b> Identify the counties where this pesticide will be used. If Statewide, indicate "all." Provide a list of Federally protected endangered/threatened species which occur in the areas of proposed use.						
<b>Title</b> Larry Zang Sr. Regulatory Manager <b>Telephone Number</b> 800-334-9481 ext 2146 <b>Date</b> February 15, 2008	<b>12. Indicate use status of Special Local Need, i.e., planned dates of use:</b> To be renewed annually between Jan 1 and Dec 31 From: January To: December <b>13. Comments (attach additional sheet, if needed)</b> 10. SLN being sought for product pending Section 3 registration at EPA 11. All						
<b>Determination by State Agency</b> This registration is for a Special Local Need and is being issued in accordance with section 24(c) of FIFRA, as amended. To the best of our knowledge, the information above is correct, except as noted in "Comments" below or in attachments							
<b>Name, Title, and Address of State Agency Official</b> Brian Verhoughstraete, Pesticide Registration Manager Michigan Dept. of Agriculture 525 W. Allegan - P.O. Box 30017 Lansing, MI 48909 le <b>Telephone Number</b> 517-241-3267 <b>Date</b> 3/27/2008	<b>Comments (by State Agency Only)</b>	<b>Received by EPA</b> 					



**syngenta**

**MIIRA**

**Section 24(c) Special Local Need Label**

**FOR DISTRIBUTION AND USE ONLY WITHIN THE STATE OF MICHIGAN**

**TREE-äge™**

MI-080001

EPA SLN No. MI-xxxxxx

**For control of Emerald Ash Borer in Ash Trees (*Fraxinus spp.*),  
Tree Injection Only**

Active Ingredient:	
Emamectin Benzoate <sup>1</sup> .....	4.0%
Other Ingredients: .....	96.0%
Total:	100.0%

<sup>1</sup>CAS No.155569-91-8

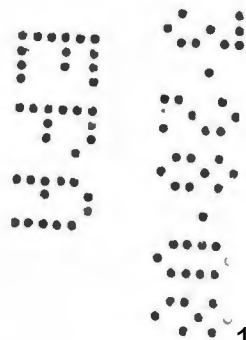
**KEEP OUT OF REACH OF CHILDREN.**

**WARNING/AVISO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.  
(If you do not understand the label, find someone to explain it to you in detail.)

See additional precautionary statements and directions for use on label and in in  
booklet

FAILURE TO FOLLOW THE DIRECTIONS FOR USE AND PRECAUTIONS ON THIS LABEL MAY  
RESULT IN POOR INSECT CONTROL, AND/OR CROP INJURY,.



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**DIRECTIONS FOR USE**

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It is a violation of federal law to use this product in a manner inconsistent with its labeling.

Follow all applicable directions, restrictions, Worker Protection Standard requirements, and precautions on the TREE-äge container label.

This label must be in the possession of the user at the time of pesticide application.

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**APPLICATION TO ASH TREES (*Fraxinus* spp.)**

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TREE-äge is for control of emerald ash borer on ash trees growing in residential and commercial landscapes, parks, plantations, right of ways, seed orchards, and forested sites (in private, municipal, state, tribal and national areas). TREE-äge contains the active ingredient emamectin benzoate and is formulated to translocate in the tree's vascular system when injected. To assure optimum effectiveness, this product must be placed into active sapwood.

**WHEN TO TREAT**

TREE-äge contains the active ingredient emamectin benzoate which is a glycoside insecticide. It is active against larva and adult Emerald Ash Borer. The primary route of toxicity is through ingestion, but may also be lethal upon contact.

**ENVIRONMENTAL CONDITIONS:** Uptake of TREE-äge is dependent upon the tree's transpiration. Transpiration is dependent on a number of abiotic and biotic factors, such as soil moisture, soil and ambient temperature, and time of day. For optimal uptake, apply when soil is moist, soil temperatures are above 45°F, ambient temperatures are between 40° to 90°F, and during the 24 hour period when transpiration is greatest, typically before 2:00 PM. Applications to drought or heat stressed trees may result in injury to tree tissue, poor treatment and subsequent control. Watering the trees prior to injection may enhance the uptake of TREE-äge.

**MONITOR TREE HEALTH and PEST INFESTATIONS:** Effective injection treatment is favored by a full canopy (i.e., leaves) and healthy vascular system. Once these tissues are compromised by arthropod damage (larval galleries, defoliation, leaf mining, etc.) an effective and uniform application of TREE-äge may be difficult to achieve and subsequent control may be poor. Optimally, treatment should be made preventively at least 2 to 3 weeks before Emerald Ash Borer historically infest the host tree. As a result of systemic movement and longevity of TREE-äge in trees, this interval may be extended much earlier to 6 months should tree dormancy, adverse weather, management, asynchronous life cycle of pests, etc., allow earlier application timing.

TREE-äge may also be effective as a curative treatment against Emerald Ash Borer. Adult foliar feeding may be controlled within one month after treatment. During the larval stage, Emerald Ash Borer attacks the stem and branches and will disrupt vascular tissue that may result in poor distribution of TREE-äge in an infested tree. However, control may be achieved if larvae come into contact or feed on TREE-äge treated tissues.

## USE

Use as formulated or dilute with equivalent 1 to 3 volumes of water or more, as necessary.

## USE RATE TABLE

Tree Diameter (DBH) (Inches)	Low ml./tree	Medium ml./tree	Medium - High ml./tree	High ml./tree	Average No. Injection Sites*
4 to 6	15	25	50	-	3
7 to 9	20	40	80	-	4
10 to 12	30	55	110	165	5
13 to 15	35	70	140	210	6
16 to 18	40	75	150	225	7
19 to 21	50	100	200	300	8
22 to 24	-	115	230	345	10
25 to 27	-	130	260	390	11
28 to 30	-	145	290	435	12
31 to 33	-	160	320	480	13
34 to 36	-	175	350	525	15
37 to 39	-	190	380	570	16
40 to 42	-	205	410	615	17
43 to 45	-	220	440	660	18
46 to 48	-	235	470	705	20
49 to 51	-	250	500	750	21
52 to 54	-	265	530	795	22
55 to 57	-	280	560	840	23
58 to 60	-	295	590	885	25
61 to 63	-	310	620	930	26
64 to 66	-	325	650	975	27
67 to 69	-	340	680	1020	28
70 to 72	-	355	710	1065	30

\* The number of injection sites listed is a guide for approximately how many are needed per size of tree.  
 For optimal control, it is recommended to be with  $\pm 1$  injection site of this number per tree.  
 Higher rates tend to provide longer residual and control of more difficult to control insects. See **Target Pest** for additional information in choosing the amount of product to apply.

### Applications in Trees

Tree Tissue to Protect	Target Pest	Recommended Rate	Comments
Foliage, Shoot, Stem, Trunk and Branch	Emerald Ash Borer- Adult and Larval stages	Low to High	For optimal control apply at least 30 days before historical egg hatch or adult flight and to trees whose vascular tissue is not damaged.  If vascular tissue is damaged or plugged by insect galleries, nematodes or fungi, uniform treatment and control may not be achieved.

### Compatibility

Do not mix TREE-äge before injection with other products such as insecticides, fungicides, plant growth regulators, surfactants, adjuvants, and fertilizers.

### RESTRICTIONS

- Do not apply to trees that may yield food consumed by humans or used in animal feed.
- Avoid treating trees that are moisture stressed or suffering from herbicide damage.

**Expiration Date: xxxx**

TREE-äge™ trademark of Arborjet, Inc.

24(c) registrant:  
 Syngenta Crop Protection, Inc.  
 P.O. Box 18300  
 Greensboro, NC 27419-8300

Label Code: MIRGNOxxxAA0208

(24C booklet)

This product is approved for distribution and use only under FIFRA Section 24(C) for control of arthropod pests in trees. The user must have a copy of the state-approved FIFRA Section 24(c) label which permits use of this product at the time of pesticide application and follow all directions for use, restrictions, and precautions. Contact your state department of agriculture or state agency responsible for pesticide regulation to determine if a Section 24(c) is in effect in your state.

**TREE-äge™**

**Injected insecticide for the control for arthropod pests in trees**

Active Ingredient:	
Eamectin Benzoate <sup>1</sup> .....	4.0%
Other Ingredients:	96.0%
Total:	100.0%

<sup>1</sup>CAS No.155569-91-8

**KEEP OUT OF REACH OF CHILDREN.**

**WARNING/AVISO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

See additional precautionary statements and directions for use in booklet.

EPA Est. 39578-TX-1

Product of China  
Formulated in the USA

SCP A22 0108

1.06 quarts (1 liter)  
Net Contents

## PRECAUTIONARY STATEMENTS

### Hazards to Humans and Domestic Animals

#### WARNING/AVISO

Causes substantial but temporary eye injury. Do not get in eyes or on clothing. Wear protective eyewear. Harmful if swallowed. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse.

FIRST AID	
<b>If in eyes</b>	<ul style="list-style-type: none"> <li>•Hold eye open and rinse slowly and gently with water for 15-20 minutes.</li> <li>•Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.</li> <li>•Call a poison control center or doctor for treatment advice.</li> </ul>
<b>If swallowed</b>	<ul style="list-style-type: none"> <li>•Call poison control center or doctor immediately for treatment advice.</li> <li>•Have person sip glass of water if able to swallow.</li> <li>•Do not induce vomiting unless told to do so by the poison control center or doctor.</li> <li>•Do not give anything by mouth to an unconscious person.</li> </ul>
<p style="text-align: center;"><b>NOTE TO PHYSICIAN</b></p> <p>Early signs of intoxication include dilation of pupils, muscular incoordination, and muscular tremors. Vomiting within one-half hour of exposure can minimize toxicity following accidental ingestion of the product; rapidly after exposure (&lt; 15 minutes) administer repeatedly medical charcoal in a large quantity of water or ipecac. If toxicity from exposure has progressed to cause severe vomiting, the extent of resultant fluid and electrolyte imbalance should be gauged. Appropriate supportive parenteral fluid replacement therapy should be given, along with other required supportive measures (such as maintenance of blood pressure levels and proper respiratory functionality) as indicated by clinical signs, symptoms, and measurements. In severe cases, observations should continue for at least several days until clinical condition is stable and normal. Since emamectin benzoate is believed to enhance GABA activity in animals, it is probably wise to avoid drugs that enhance GABA activity (barbiturates, benzodiazepines, valproic acid) in patients with potentially toxic emamectin benzoate exposure.</p>	



Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

**HOT LINE NUMBER**

For 24-Hour Medical Emergency Assistance (Human or Animal),  
Or Chemical Emergency Assistance (Spill, Leak, Fire or Accident)

Call

**1-800-888-8372**

**Personal Protective Equipment (PPE)**

Applicators and other handlers must wear:

- long-sleeved shirt and long pants
- shoes and socks
- protective eyewear

**Environmental Hazards**

This product is highly toxic to fish, mammals and aquatic invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater. This product is highly toxic to bees exposed to direct treatment or residues on blooming trees.

**Physical or Chemical Hazards**

Do not use or store near heat or open flame.

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**CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY**

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**NOTICE:** Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of this product must be followed carefully. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of SYNGENTA CROP PROTECTION, Inc. or Seller. To the extent permitted by applicable law, Buyer and User agree to hold SYNGENTA and Seller harmless for any claims relating to such factors.

SYNGENTA warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. To the extent permitted by applicable law: (1) this warranty does not extend to the use of the product contrary to label instructions or under conditions not reasonably foreseeable to or beyond the control of Seller or SYNGENTA, and, (2) Buyer and User assume the risk of any such use. **TO THE EXTENT PERMITTED BY APPLICABLE LAW, SYNGENTA MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS WARRANTED BY THIS LABEL.**

To the extent permitted by applicable law, in no event shall SYNGENTA be liable for any incidental, consequential or special damages resulting from the use or handling of this product. **TO THE EXTENT PERMITTED BY APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF SYNGENTA AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF SYNGENTA OR SELLER, THE REPLACEMENT OF THE PRODUCT.**

SYNGENTA and Seller offer this product, and Buyer and User accept it, subject to the foregoing Conditions of Sale and Limitation of Warranty and Liability, which may not be modified except by written agreement signed by a duly authorized representative of SYNGENTA.

## DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

**IMPORTANT:** Read entire label before using this product. Failure to follow label instructions may result in poor control or tree injury. Failure to follow label directions may cause injury to people, animals and environment.

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### APPLICATION TO TREES

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TREE-äge is for control of mature and immature arthropod pests of trees, including, but not limited to, those growing in residential and commercial landscapes, parks, plantations, seed orchards, and forested sites (in private, municipal, state, tribal and national areas). TREE-äge contains the active ingredient emamectin benzoate and is formulated to translocate in the tree's vascular system when injected. To assure optimum effectiveness, this product must be placed into active sapwood.

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### GENERAL DIRECTIONS

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TREE-äge is designed for use with tree injection devices that meet the label and dose requirements (for example, the Arborjet Tree Injection Systems) for the control of listed pests of trees. Follow manufacturer's directions for equipment use.

Dosages are based on the Diameter (in inches) of the tree at Breast Height (DBH"). Breast height is a standardized distance of 54" from the ground. Often the diameter is determined from measuring the circumference of the tree at this height, and dividing circumference (in inches) by three (3). To determine DBH" for multi-stemmed woody ornamentals, measure the DBH" for each stem or branch and add together for the total DBH" per tree.

**Placement of Application/Injection Sites:** for optimum distribution, inject at the base of the tree. Inject into the stem within 12" of the soil, into the trunk flare or into tree roots exposing them by shallow excavation. Make applications into intact, healthy sapwood. Avoid injured areas or areas with decay. Select injection sites associated with stem growth.

**Number of Injection Sites:** Work around the tree, spacing injection sites approximately every 6.0 inches of tree's circumference.

**Drill Depth:** Drill through the bark then 5/8" to 1-5/8" (hardwoods) or 1-5/8" to 2" (conifers) into the sapwood with the appropriate sized drill bit. Use clean, sharp drill bits. Brad point bits are recommended. Precautions should be taken to avoid diseased areas and transferring infected tissues to other injection sites.

## **Resinous Conifers**

In resinous conifers, such as pine and spruce, start the injection immediately after drilling into the sapwood. A prolonged delay may reduce uptake on account of resin flow into opening.

## **WHEN TO TREAT**

TREE-äge contains the active ingredient emamectin benzoate which is a glycoside insecticide. It is active against immature and adult stages of arthropods. The primary route of toxicity is through ingestion, but may also be lethal upon contact.

**ENVIRONMENTAL CONDITIONS:** Uptake of TREE-äge is dependent upon the tree's transpiration. Transpiration is dependent on a number of abiotic and biotic factors, such as soil moisture, soil and ambient temperature, and time of day. For optimal uptake, apply when soil is moist, soil temperatures are above 45°F, ambient temperatures are between 40° to 90°F, and during the 24 hour period when transpiration is greatest, typically before 2:00 PM. Applications to drought or heat stressed trees may result in injury to tree tissue, poor treatment and subsequent control. Watering the trees prior to injection may enhance the uptake of TREE-äge.

**MONITOR TREE HEALTH and PEST INFESTATIONS:** Effective injection treatment is favored by a full canopy (i.e., leaves) and healthy vascular system. Once these tissues are compromised by arthropod damage (larval galleries, defoliation, leaf mining, etc.) an effective and uniform application of TREE-äge may be difficult to achieve and subsequent control may be poor. Optimally, treatment should be made preventively at least 2 to 3 weeks before arthropods historically infest the host tree. As a result of systemic movement and longevity of TREE-äge in trees, this interval may be extended much earlier to 6 months should tree dormancy, adverse weather, management, asynchronous life cycle of pests, etc., allow earlier application timing.

## **Compatibility**

Do not mix TREE-äge before injection with other products such as insecticides, fungicides, plant growth regulators, surfactants, adjuvants, and fertilizers.

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## **RESTRICTIONS**

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- Do not apply to trees that may yield food consumed by humans or used in animal feed.
- Avoid treating trees that are moisture stressed or suffering from herbicide damage.

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**STORAGE AND DISPOSAL**

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Do not contaminate water, food, or feed by storage and disposal.

**Pesticide Storage**

Store in a cool, dry place, away from children and pets. Keep from freezing.

**Pesticide Disposal**

Waste resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

**Container Disposal**

Triple rinse or equivalent. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or by other procedures approved by state and local authorities.

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TREE- äge is a registered trademark of Arborjet, Inc.

Manufactured for:  
Syngenta Crop Protection, Inc.  
P.O. Box 18300  
Greensboro, North Carolina 27419-8300  
[www.syngenta-us.com](http://www.syngenta-us.com)

SCP A22 0108

TREE-age 24C-A22 0108-booklet-Ig-1-21-08

*(24C non-detachable container label)*

This product is approved for distribution and use only under FIFRA Section 24(C) for control of arthropod pests in trees. The user must have a copy of the state-approved FIFRA Section 24(c) label which permits use of this product at the time of pesticide application and follow all directions for use, restrictions, and precautions. Contact your state department of agriculture or state agency responsible for pesticide regulation to determine if a Section 24(c) is in effect in your state.

**TREE-äge™****Injected insecticide for the control for arthropod pests in trees**

Active Ingredient:

Emamectin Benzoate<sup>1</sup> ..... 4.0%

Other Ingredients: ..... 96.0%

Total: ..... 100.0%

<sup>1</sup>CAS No.155569-91-8**KEEP OUT OF REACH OF CHILDREN.****WARNING/AVISO**

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

See additional precautionary statements and directions for use in booklet.

EPA Est. 39578-TX-1

SCP A22 0108

1.06 quarts (1 liter)

Net Contents



## PRECAUTIONARY STATEMENTS

### Hazards to Humans and Domestic Animals

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Causes substantial but temporary eye injury. Do not get in eyes or on clothing. Wear protective eyewear. Harmful if swallowed. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse.

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<p style="text-align: center;"><b>NOTE TO PHYSICIAN</b></p> <p>Early signs of intoxication include dilation of pupils, muscular incoordination, and muscular tremors. Vomiting within one-half hour of exposure can minimize toxicity following accidental ingestion of the product; rapidly after exposure (&lt; 15 minutes) administer repeatedly medical charcoal in a large quantity of water or ipecac. If toxicity from exposure has progressed to cause severe vomiting, the extent of resultant fluid and electrolyte imbalance should be gauged. Appropriate supportive parenteral fluid replacement therapy should be given, along with other required supportive measures (such as maintenance of blood pressure levels and proper respiratory functionality) as indicated by clinical signs, symptoms, and measurements. In severe cases, observations should continue for at least several days until clinical condition is stable and normal. Since emamectin benzoate is believed to enhance GABA activity in animals, it is probably wise to avoid drugs that enhance GABA activity (barbiturates, benzodiazepines, valproic acid) in patients with potentially toxic emamectin benzoate exposure.</p>	

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**HOT LINE NUMBER**

For 24-Hour Medical Emergency Assistance (Human or Animal),  
Or Chemical Emergency Assistance (Spill, Leak, Fire or Accident)  
Call  
**1-800-888-8372**

**STORAGE AND DISPOSAL**

Do not contaminate water, food, or feed by storage and disposal.

**Pesticide Storage**

Store in a cool, dry place, away from children and pets. Keep from freezing.

**Pesticide Disposal**

Waste resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

**Container Disposal**

Triple rinse or equivalent. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or by other procedures approved by state and local authorities.

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[www.syngenta-us.com](http://www.syngenta-us.com)

SCP A22 0108

TREE-age 24C-A22 0108-booklet-Ig-1-21-08

February 1, 2008

Mr. Brian Hughes  
Michigan Dept. of Agriculture, PPPM Division  
PO Box 30017  
Lansing, MI 48909

Subject: Section 24(C) request for 'Tree-Age' for control of emerald ash borer

Dear Brian,

This letter is in support of a Section 24(c) registration for emamectin benzoate, an insecticide that appears to be highly effective as a tree injection treatment for controlling emerald ash borer (*Agrilus planipennis* Fairmaire) (Coleoptera: Buprestidae). It is my understanding that Syngenta Crop Protection Inc. is seeking a Section 3 registration for this formulation from EPA under the name Tree-age, but approval is not expected until mid July 2008.

**Background:** As you know, emerald ash borer (EAB) is an invasive pest native to Asia that was discovered in North America in 2002. Currently, six states and the province of Ontario are dealing with EAB infestations. Adult beetles, active from mid May through August, feed on ash (*Fraxinus* sp.) foliage throughout their 3 to 6 week life span. Larvae feed in the phloem (inner bark) of the branches and trunk of ash trees during late summer and fall, disrupting the ability of the tree to transport nutrients and water (Cappaert et al. 2005).

Southeast Michigan, where EAB first became established (Siegert et al. 2007), has been severely affected by EAB. An estimated 25 million ash trees have been killed by EAB in this region alone. Additional populations of EAB continue to build in many areas of lower Michigan and two outlier populations were discovered in the Upper Peninsula last fall. More than 800 million ash trees growing in Michigan forests are likely to succumb as EAB populations expand. Millions of landscape ash trees planted by communities and private landowners are also vulnerable. A recent economic analysis predicted that EAB impacts on municipal landscape trees could cost Ohio communities \$1.8 to \$7.6 billion (Sydnor et al. 2007).

Several insecticide products, primarily neo-nicotinoids, are currently being used to protect high-value ash trees in landscape settings from EAB. These systemic products are typically applied annually, via trunk injection or as a soil drench or soil injection. Several products appear to successfully protect some ash trees in some situations, especially if used for multiple years. Effectiveness of these treatments, however, varies depending on the product and application method, tree size and vigor, growing conditions and beetle density in the area. In a four-year study conducted in two Ann Arbor neighborhoods, for example, green ash and white ash trees were treated annually from 2003-2006 with three commonly used insecticides applied as trunk injections. By fall 2006, 40-100% of the treated trees had died and even the surviving trees exhibited at least 20% canopy dieback (McCullough et al. 2006, Cappaert et al. 2007).

Moreover, none of the insecticide products currently registered for EAB control have been used in operational EAB programs to date. This is largely because efficacy of the treatments is difficult to predict and in general, efficacy is not sufficient to be acceptable to regulatory officials.

**2007 Study design:** In 2007, we initiated a study to assess the effectiveness of emamectin benzoate (applied as a trunk injection) for EAB control. We established a total of 25 randomized blocks at three different sites, enabling us to evaluate a range of tree size and growing conditions. Mean diameter at breast height (DBH) of trees used in the study ranged from 6.0 inches at the site with the smallest trees to 13.2 inches at the site with the largest trees. There were 6 to 12 trees per treatment at each of the three sites. Each block included seven trees of similar size, condition and location (total of 175 trees). Products tested, application rates and dates of application are presented in Table 1.

Our study was funded by grants from the USDA Forest Service and MSU's Project GREEN. The private companies involved in production or distribution of the products we tested supplied the insecticides and in some cases, assisted with application. They did not directly fund the research nor were any representatives from these companies involved in data collection.

**Evaluation:** To evaluate the insecticide treatments, we assessed insecticide residues in foliage over time and conducted bioassays to evaluate survival of adult EAB beetles caged with leaves from treated trees. In addition, we quantified larval density on a subset of trees in fall.

Foliage samples were collected from 8 locations in each tree in mid June, early July, late July and mid August. Foliage was individually bagged and frozen for eventual residue analysis by USDA APHIS cooperators with ELISA (imidacloprid, dinotefuron) or MS/HPLC (emamectin benzoate) methods. Analysis of foliage samples is in progress.

**Adult EAB bioassays:** Bioassays were conducted in mid June, early July and late July to assess survival of adult EAB beetles caged with leaves from each study tree. On each foliage sampling date, two leaves from opposite sides of each tree were selected for the bioassays. We placed three, apparently healthy, 4-8 day-old beetles with each leaf for four days. Beetle survival and feeding activity were monitored daily over the four days of the bioassay period.

By Day 4, mortality of beetles caged with leaves from the untreated control trees averaged 35%, 16% and 18%, respectively, in the June 15, July 11 and August 1 bioassays (Fig. 1). Mortality of beetles caged with leaves from trees treated with imidacloprid or dinotefuron ranged from 32% to 81% in the June 15 bioassay, but mortality rates dropped in subsequent bioassays. These mortality rates and the decline in foliage toxicity over time are similar to results from previous studies we have conducted with EAB.

Notably, however, we observed 100% mortality of beetles caged with leaves from emamectin benzoate trees in all three bioassay periods (Fig. 1). We have not previously recorded 100% EAB mortality in any bioassay with any of the insecticide products tested during the past three years.

**Larval density:** Larval density was assessed in late September by felling and debarking areas on the trunk and in the canopy of trees. We felled three blocks of trees at the 7-L site and four blocks of trees at the IS site (49 total trees) to estimate larval density in 2007. The remaining blocks of trees were left intact so that they can be re-treated and monitored through 2008.

At the 7-L site, we excavated at least 9-12 bark windows per tree on the 21 trees that were felled. Each bark window was  $\geq 500 \text{ cm}^2$  in area. At the IS site, we excavated at least 32 windows per tree on the 28 trees that were felled. All seven trees treated with emamectin benzoate, however, were completely debarked to quantify larval density on the trunk and branches  $> 6 \text{ cm}$  diam. Larval density, stage and viability were recorded and standardized per  $\text{m}^2$  of phloem.

Larval density varied considerably within and among treatments, as expected. Larval density on the untreated control trees at the IS site averaged 68 ( $\text{SE} \pm 33.3$ ) larvae per  $\text{m}^2$ . Average larval density on IS trees treated with either an imidacloprid product or dinotefuron ranged from 14 to 75 larvae per  $\text{m}^2$ . At the 7-L site, larval density on untreated controls averaged 132 ( $\pm 78.75$ ) larvae per  $\text{m}^2$ , while average larval density on trees treated with imidacloprid or dinotefuron ranged from 37 to 62 larvae per  $\text{m}^2$ .

The efficacy of the emamectin benzoate, however, was striking. When we completely debarked the seven emamectin benzoate trees, we exposed more than  $40 \text{ m}^2$  of phloem. We found a total of only 8 live larvae, equivalent to 0.19 larvae per  $\text{m}^2$ . There were no more than 3 live larvae on any of the trees and 2 of the trees had zero live larvae. Overall, emamectin benzoate provided  $> 99\%$  control of EAB, relative to untreated controls. We recovered a total of 81 dead EAB larvae on the seven trees, most of which were late instars. Results from the larval sampling, combined with the adult bioassay data, indicate that emamectin benzoate probably acts primarily on adult EAB and/or neonate larvae; otherwise we would have expected to find hundreds of dead late stage larvae on the trees. Moreover, because emamectin benzoate affected adult EAB and/or neonate larvae, the trees sustained little injury.

**Summary:** Although we have conducted research with various systemic insecticides since EAB was identified in 2002 (Cappaert et al. 2006, 2007; McCullough et al. 2005, 2006, 2007), we have never observed this level of control. We plan to continue and expand our research with emamectin benzoate to assess product persistence and related issues. In my opinion, however, our 2007 data indicate that the emamectin benzoate treatment provided a level of EAB control that is remarkably superior to that provided by any of the other products we have evaluated.

Given the results of our 2007 study, the wide distribution of EAB in lower Michigan and the potentially staggering impacts of EAB on urban ash trees, I believe that approval of a 24(c) registration for use of emamectin benzoate is justified. I expect that there will be considerable interest in using emamectin benzoate to treat ash trees in landscapes as soon as it becomes available. In addition, emamectin benzoate could potentially have a role in operational programs that may be implemented to slow the spread of EAB across the U.S.

I appreciate your attention and interest in this matter. If I can be of further assistance or provide more information, please let me know.

Sincerely,

Deborah G. McCullough  
Professor

## References

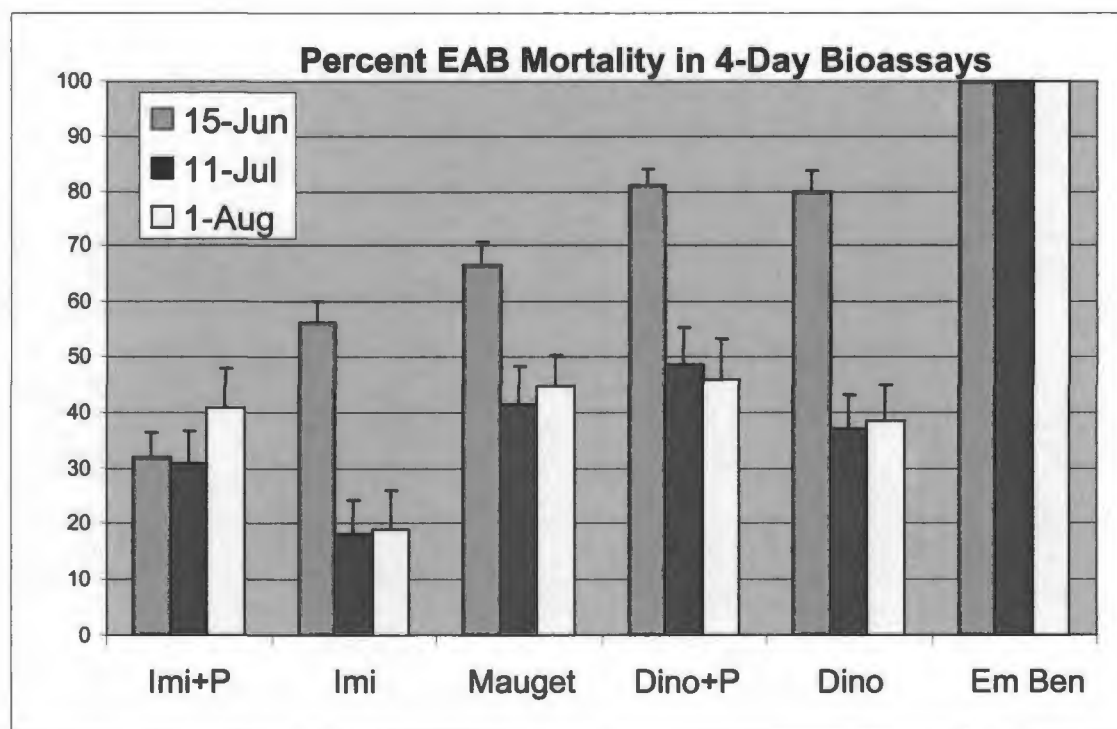
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**Table 1.** Insecticide products and application methods evaluated in 2007.

Product	Active ingredient (a.i.)	Application method	Date applied	Rate (g a.i./DBH inch)
Control	---	None	---	0
Imicide (10%)	imidacloprid	Mauget capsules; trunk injection	May 22	0.06
Macho 2F (21.4%)	imidacloprid	Trunk spray	May 4	1.70
Macho 2F + Pentra-Bark*	imidacloprid	Trunk spray	May 4	1.70
Safari (20%)	dinotefuron	Trunk spray	May 31	1.70
Safari + Pentra-Bark*	dinotefuron	Trunk spray	May 31	1.70
Enamectin benzoate	Enamectin benzoate	Arbor-jet micro-injector; Trunk injection	May 22	0.10 g for dbh $\leq$ 6.5" 0.15 for dbh 6.5-10" 0.20 for dbh $\geq$ 10"

\*3 oz Pentra-Bark per gallon



**Fig. 1.** Average percentage mortality ( $\pm$  SE) (corrected to controls) of adult emerald ash borers caged with leaves from trees treated with insecticides in the 2007 study. N = 25 trees per treatment.